

persisting for up to 9 months ($\pm$ leafless when flowering), leaving a relatively conspicuous $\pm$ circular scar. *Inflorescence* a single shortly pedunculate cyme of three cyathia arranged in a plane at right-angles to the axis of the branch, produced from the flowering eye 4–6 mm. above the spine pairs; peduncle bibracteate, up to 3 mm. long; bracts depressed ovate, truncate, irregularly dentate; primary cyathium usually male deciduous, sometimes bisexual, the secondary lateral bisexual cyathia are raised on cyme branches up to 3 mm. long; tertiary bisexual cyathia are frequently produced from the axils of the bracts of the lateral cyathia; bracts more or less ovate, irregularly denticulate. *Involucre* infundibuliform 5–6 mm. diam., 3.5–4 mm. long, with 5 erect, transversely broadly elliptic fimbriate lobes c. 2.25 mm. long and 5 oblong-elliptic glands, 2–3 mm. wide, lightly pitted on the somewhat concave or flat upper surface, suberect or spreading, sometimes with a raised lip on the inner margin. *Male flowers* 20–25 (45) arranged in 5 fascicles; fascicular bracts fimbriate laciniate; bracteoles narrow with 2 or 3 filiform fimbria (the fascicular bract and bracteoles becoming reduced as the number of male flowers increases, until with 45 stamina the bract is sometimes absent). *Pistillate flower*: ovary very soon exserted on a long recurved pedicel, sutures and angles usually with a raised rib; ovule under a minute 2-lobed, fringed hood; styles spreading recurved, c. 2.5 mm. long with bifid rugulose apices. *Capsule* obtusely triangular (sometimes 4-locular $\pm$ rectangular) truncate, up to 4 mm. long, 7 mm. diam., usually with the sutures and angles distinctly ribbed or keeled, far exserted on a recurved pedicel c. 7 mm. long; perianth $\pm$ 3-lobed triangular with the apex of the lobes emarginate, truncate or acute. *Seed* subglobose c. 2.5×2 mm., smooth or sometimes very obscurely pustulate, pale brown with irregular brownish cream blotches; suture slightly raised, plainly marked with dark brown lines.

ACKNOWLEDGMENTS

The author wishes to acknowledge his indebtedness to:

Dr. A. S. Boughey, and Messrs. T. Brunton, R. B. Drummond and G. Williamson for living plants of *E. persistentifolia* and other *Euphorbia* spp. from the *Flora Zambesiaca* area.

Dr. L. E. Codd, Chief, Botanical Research Institute, Pretoria, and his staff for the facilities of the Herbarium and for much other assistance.

Dr. H. Wild and members of the staff of the Government Herbarium, Salisbury, for the facilities of the Herbarium and for a great deal of help and advice.

A REVIEW OF THE SOUTHERN AFRICAN SPECIES OF THELYPTERIS

E. A. C. L. E. SCHELPE

(*Bolus Herbarium, University of Cape Town*)

ABSTRACT

The taxonomy of the thirteen species of *Thelypteris* known to occur in Southern Africa is reviewed and a key to these species is provided. A new species, *T. chaseana*, and a new variety, *T. dentata* var. *buchananii*, are described. Six new combinations in this genus are proposed.

INTRODUCTION

Sim (1915), following Christensen's 'Index Filicum' (1906), placed ferns now referred to the genera *Arthropteris* (Davalliaceae), *Thelypteris* and *Ampelopteris* (Thelypteridaceae), *Dryopteris*, *Hypodematium*, *Arachniodes* and *Ctenitis* (Aspidiaceae) under the genus *Dryopteris* in the wide sense. This classification has since had to be revised in the light of morphological and cytological evidence.

In the genus *Thelypteris*, as construed here, Sim's treatment at specific level has not proved to be workable as even indusiate and 'non-indusiate' species of this genus appear to have been confused. Also some of the specific epithets used by Sim are not applicable to the Southern African species. Consequently, as many of these are common ferns in this region, it is felt that a review of the species of *Thelypteris* occurring in Southern Africa, together with a key for their identification, should be presented in advance of a monograph of the pteridophytes of this region. The concept of the genus *Thelypteris* as construed here follows that of Morton and includes species previously referred to the genera *Thelypteris* (nom. gen. cons.), *Lastrea*, *Cyclosorus* and *Leptogramma*.

The author wishes to thank Mr. C. V. Morton, Smithsonian Institution, Washington, D.C. for valuable discussion and the Director, Royal Botanic Gardens, Kew, for facilities for study. The author also wishes to acknowledge, with gratitude, the receipt of a grant from the Bremner Travel Fund of the University of Cape Town.

KEY TO THE SOUTHERN AFRICAN SPECIES OF THELYPTERIS

- | | | | | |
|---|----|----|------------------|---|
| 1. Sori elongate, without indusia (Subgen. <i>Leptogramma</i>) | .. | .. | <i>T. pozoii</i> | |
| 1'. Sori round, with indusia, at least on the immature fronds | .. | .. | .. | 2 |

- | | | |
|------|--|--|
| 2. | Veins of the pinna lobes free, or the basal veins meeting at the sinus between the pinna lobes or in a membrane extending from the sinus towards the costa (Subgen. <i>Thelypteris</i>) | 3 |
| 2'. | One or more pairs of veins of the pinna lobes anastomosing below the sinus between the pinna lobes. (Subgen. <i>Cyclosorus</i>) | 8 |
| 3. | Fronds glabrous except for small broad scales borne along the costae on the undersurface of the frond | <i>T. palustris</i> var. <i>squamigera</i> |
| 3'. | Fronds set with hairs or glands, at least along the costae and veins on the undersurface of the frond | 4 |
| 4. | Fronds longly decrescent with a series of reduced auriculate pinnae extending down the 'stipe' | <i>T. longicuspis</i> |
| 4'. | Fronds not or gradually decrescent but without a long series of much reduced auriculate pinnae extending down the 'stipe' | 5 |
| 5. | Veinlets not anastomosing | 6 |
| 5'. | Basal veinlets anastomosing in the sinus or in a membrane extending from the sinus | 7 |
| 6. | Undersurface of the lamina with red glands | <i>T. strigosa</i> |
| 6'. | Undersurface of the lamina without red glands | <i>T. bergiana</i> |
| 7. | Rhizome erect | <i>T. gueintziana</i> |
| 7'. | Rhizome horizontal, creeping | <i>T. chaseana</i> |
| 8. | One pair of veinlets anastomosing below the sinus | 9 |
| 8'. | Two or more pairs of veinlets anastomosing below the sinus | 11 |
| 9. | Yellow glands present on the undersurface of the veins | <i>T. extensa</i> |
| 9'. | Hairs present on the undersurface of the veins | 10 |
| 10. | Fronds gradually decrescent, rhizome creeping | <i>T. dentata</i> |
| 10'. | Fronds not decrescent, rhizome erect | <i>T. quadrangularis</i> |
| 11. | Lamina proliferous near the apex, rhizome erect | <i>T. madagascariensis</i> |
| 11'. | Lamina not proliferous, rhizome creeping | 12 |
| 12. | Frond decrescent | <i>T. dentata</i> var. <i>buchananii</i> |
| 12'. | Frond not decrescent | 13 |
| 13. | Veinlets in 6-10 pairs per pinna lobe | <i>T. totta</i> |
| 13'. | Veinlets in 15-24 pairs per pinna lobe | <i>T. striata</i> |

1. *Thelypteris palustris* Schott var. *squamigera* (Schlechtend.) Tard. in Mém. I.F.A.N., 28: 119, t.20, figs. 7-9 (1953).

Aspidium thelypteris (L.) Sw. var. *squamigerum* Schlechtend., Adumbr.: 23, t.11 (1825). (Varietal type from Cape Province, S. Africa).

Dryopteris thelypteris (L.) A. Gray var. *squamigera* (Schlechtend.) C. Chr., Ind. Fil.: 297 (1905).

Aspidium squamigerum (Schlechtend.) Fée, Mém. Fam. Foug., 8: 104 (1857).

Lastrea thelypteris (L.) Bory var. *squamigera* (Schlechtend.) Beddome, Handb. Ferns Brit. India, Suppl.: 54 (1892).

Pteris confluens Thunb., Prod. Pl. Cap.: 171 (1800). (Type from Cape Province, S. Africa; seen at UPS).

Lastrea squamulosa Presl, Tentamen: 76 (1836) nom. nud.

Nephrodium squamulosum Hook. f., Fl. N.Z., 2: 39 (1855).

Thelypteris squamulosa (Hook. f.) Ching in Bull. Fan Mem. Inst. Biol. Bot., 6: 5, 329 (1936).

The African and Australasian var. *squamigera* differs from the typical European variety in having small broad scales set along the costae of the pinnae on the undersurface of the frond. This variety seems to have been founded

on specimens collected near the Hex River, Cape Province, by Mund and Maire, and possibly by Bergius. The holotype of *Pteris confluens* Thunb. was collected by Thunberg at the Cape. (Schelpe, 1963).

2. ***Thelypteris bergiana*** (Schlechtend.) Ching in Bull. Fan Mem. Inst. Biol. Bot., **10** : 251 (1941).

Polypodium bergianum Schlechtend., Adumbr.: 20, t.9 (1825). (Type from Cape Province, S. Africa).

Lastrea bergiana (Schlechtend.) Moore, Index : 86 (1858).

Nephrodium bergianum (Schlechtend.) Bak., Syn. Fil: 269 (1867).

Dryopteris bergiana (Schlechtend.) O. Kuntze, Rev. Gen. Pl., **2** : 812 (1891).

Nephrodium sewellii Bak. in Journ. Linn. Soc., Lond., **15** : 418 (1876). (Type from Madagascar; seen at K).

Dryopteris sewellii (Bak.) C. Chr., Ind. Fil.: 292 (1905).

Nephrodium anateinophlebium Bak. in Journ. Linn. Soc., Lond., **16** : 202 (1877). (Type from Madagascar; seen at K).

Dryopteris anateinophlebia (Bak.) C. Chr., Ind. Fil.: 252 (1905).

Aspidium maranguense Hieron. in Engler, Pflanzenw. Ost.-Afr., C : 85 (1895). (Type from East Africa).

Dryopteris maranguensis (Hieron.) C. Chr., Ind. Fil.: 252 (1905).

Lastrea maranguensis (Hieron.) Copel., Gen. Fil.: 139 (1947).

Dryopteris palmii C. Chr. in Ark. f. Bot., **14** : 1, t.2, fig. 6 (1916). (Type from Madagascar).

T. bergiana has been confused widely with *T. gueintziana* in the past. In *T. bergiana* the indusia are very small and are only visible on immature fronds. Later they become detached or enveloped by the maturing sorus, whereas the larger pilose indusia of *T. gueintziana* are persistent.

3. ***Thelypteris strigosa*** (Willd.) Tard. in Humbert, Fl. Madag., Polypod., **1** : 274 (1958).

Aspidium strigosum Willd. in L., Sp. Pl., ed. iv, **5** : 249 (1810). (Type from Mauritius; seen in Herb. Willd., B).

Nephrodium strigosum (Willd.) Desv. in Mém. Soc. Linn., Par., **6** : 256 (1827).

Lastrea strigosa (Willd.) Presl, Tentamen : 75 (1836).

Dryopteris strigosa (Willd.) C. Chr., Ind. Fil.: 295 (1905).

Aspidium pulchrum Bory ex Willd. in L., Sp. Pl., ed. iv, **5** : 253 (1810). (Type from Réunion).

Nephrodium pulchrum (Bory ex Willd.) Desv. in Mém. Soc. Linn., Par., **6** : 256 (1827).

Lastrea pulchra (Bory ex Willd.) Presl, Tentamen : 75 (1836).

Typical *T. strigosa* is superficially similar to small forms of *T. bergiana* but has the undersurface of the lamina set with numerous small red glands. In Southern Africa, it is so far only known from the eastern districts of Southern Rhodesia.

4. *Thelypteris longicuspis* (Bak.) Schelpe comb. nov.

Nephrodium longicuspis Bak. in Journ. Linn. Soc. Lond., **16** : 202 (1877)—basionym. (Type from Madagascar; seen at K).

Aspidium longicuspis (Bak.) Kuhn in v. Decken Reisen. **3** (3) Bot.: 65 (1879).

Dryopteris longicuspis (Bak.) C. Chr., Ind. Fil.: 275 (1905).

Nephrodium zambsiacum Bak. in Ann. of Bot., **5** : 318 (1891). (Type from Nyasaland; seen at K).

Aspidium zambsiacum (Bak.) Hieron. in Engler, Pflanzenw. Ost-Afr., **C** : 85 (1895).

Dryopteris zambsiaca (Bak.) C. Chr., Ind. Fil.: 318 (1905).

Thelypteris zambsiaca (Bak.) Tard. in Not. Syst., **14** : 345 (1952).

Specimens of *T. longicuspis* from the African mainland have been referred to *T. zambsiaca* in the past. However, an examination of the types of these two species at Kew shows that there are no significant differences between them. The abruptly decrescent base of the frond with a long series of much reduced auriculate pinnae extending down the stipe is characteristic. It is only known as far south as Southern Rhodesia.

In the typical form, the indusia are only set with small glands but some plants from the eastern districts of Southern Rhodesia have more or less pilose indusia (e.g. Chase 4627, 4628, 4665, 5577). These have been referred erroneously to the West African *T. guineensis* (Christ in Cheval.) Alston.

5. *Thelypteris gueintziana* (Mett.) Schelpe comb. nov.

Aspidium gueintzianum Mett., Phleg. u. Asp.; 83, n. 201 (1858)—basionym. (Type from Natal, S. Africa; seen at B).

Lastrea gueintziana (Mett.) Moore, Index : 93 (1858).

Nephrodium gueintzianum (Mett.) Hieron. in Bot. Jahrb., **28** : 341 (1900).

The typical form of *T. gueintziana* from Natal and the Cape Province has conspicuously attenuated apices to the pinnae. This apparently grades northwards into plants with more blunt pinna apices described as *T. pseudogueintziana* Bonap., described from the Congo. The latter was described as having a creeping rhizome, a description which is not in accord with the type specimen which was seen at Kew on loan from Paris. In this specimen the rhizome is curved, probably as a result of the plant gradually toppling as it grew. Furthermore the comment that *T. pseudogueintziana* differs from *T. gueintziana* in lacking

yellow glands on the lower surface is misleading, as the type of *T. gueintziana* is devoid of yellow glands.

6. ***Thelypteris chaseana*** Schelpe sp. nov.

Rhizoma repens, 11 mm. diam., paleis lanceolatis, 8 mm. longis, integris brunneis vestitis. Stipes teres stramineus 61 cm. longus, paleis ad basim lanceolatis brunneis. Lamina bipinnatifida ambitu lanceolata, pinnis infimis nonnihil reductis et deflexis. Rachis straminea villosa. Pinnae cultratae acutae, 15 cm. longae, 2 cm. latae, pinnatisectis fere ad costam, lobis anguste oblongis, leviter falcatis, venulis c. 11-jugis, costis venulisque supra et subtus pilosis, venulis basalibus confluentibus, sive fere confluentibus, ad sinum. Sori c. 12 per lobus pinnarum, indusiis parvis pilosis.

Rhizome creeping, 11 mm. diam., clothed in lanceolate entire brown scales c. 8 mm. long. Stipe stramineous 61 cm. long with brown scales at the base. Lamina lanceolate in outline, 78 cm. long (up to 1.2 m.), 30 cm. broad with the lowest three pairs of pinnae deflexed and somewhat reduced. Rachis stramineous, villous. Pinnae c. 15 cm. long, 2 cm. broad, cultrate acute. pinnatisect almost to the costa, the lobes narrowly oblong, somewhat falcate each with about 11 pairs of veins, the costae and veins pilose above and below and with only the basal veinlets joining, or almost joining, in a membrane at the sinus; the basal acroscopic pinna lobe larger than the rest. Sori about 12 per pinna lobe, situated halfway between the margin and the costule; indusia small, pilose.

HOLOTYPE: South West Africa, Otjiwarongo district, Grosse Waterberg above Waterberg Station; locally common along perennial stream in bush in shade on south aspect. 5200 ft. alt. 14. vii. 1954. *Schelpe* 4791 (BOL).

PARATYPES: SOUTH WEST AFRICA: Great Waterberg, *Rodin* 2593 (BOL, K).

RHODESIA: Goromonzi district, 38 mls. N.E. of Salisbury, on Shamva road, *Mitchell* 584 (BOL ex SRGH); Goromonzi district, Chishawasha, *Mitchell* 565 (BOL ex SRGH); Melsetter district, between Cashel and Melsetter, *Schelpe* 4013 (BOL); Umtali district, near Odzani River bridge, *Schelpe* 5652 (BOL).

MALAWI: c.4 mls. S. of Dedza, *Robson* 1423 (K).

ZAMBIA: Kashitu River, *Rogers* 8308 (K).

TANZANIA: Arusha district, Sokon, near Arusha, *Milne-Redhead & Taylor* 7026a (K); Iringa district, Kilolo, Dabaqa Highlands, *Polhill & Paulo* 1430 (K).

ANGOLA: Golungo Alto, Rio Cuanzo, near Sange, *Welwitsch* 130 (K).

T. chaseana is readily distinguished from *T. gueintziana* by its creeping rhizome, a part of the plant unfortunately but frequently neglected by collectors. In some specimens seen, which may be referable to this species, the indusia are glandular as well as pilose. This new species is named after Mr. N. C. Chase

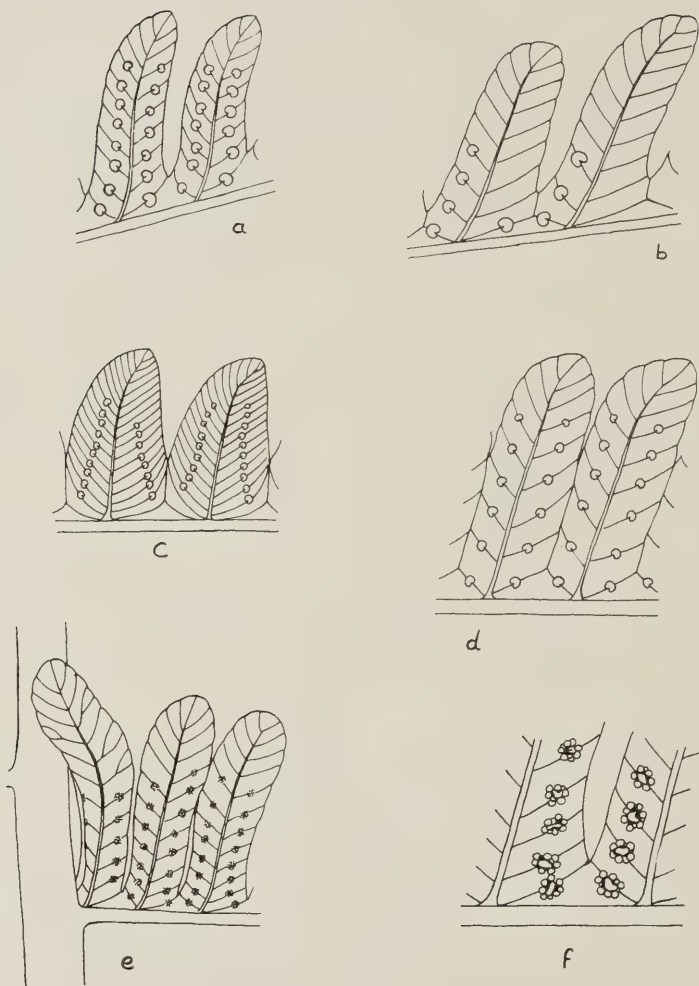


FIG. 1.

Diagrams of venation in some Southern African species of *Thelypteris*. (a) *T. gueintziana* (X 3). (b) *T. quadrangularis* (X 3). (c) *T. striata* (X 3). (d) *T. dentata* var. *buchananii* (X 3). (e) *T. chaseana* basal acroscopic pinna lobes (X 3). (f) *T. chaseana*, sinus between pinna lobes (X 6).

of Umtali who has done extremely valuable field work on the ferns of Rhodesia and Moçambique.

7. ***Thelypteris dentata*** (Forsk.) E. St. John. in Amer. Fern. Journ., **26** : 44 (1936). *Polypodium dentatum* Forsk., Fl. Aegypt. Arab. : 185 (1775). (Type from Yemen; seen at C).

Dryopteris dentata (Forsk.) C. Chr. in Vid. Selsk. Skr., Afd. 8, **6** : 24 (1920).

Cyclosorus dentatus (Forsk.) Ching in Bull. Fan Mem. Inst. Biol. Bot., **8** : 206 (1938).

Aspidium natalense Fée, Mém. Fam. Foug., **8** : 102 (1857). (Type from Natal, S. Africa).

Nephrodium hispidulum Peter in Fedde Rep. Sp. Nov., Beih., **40** : descr. 10, t.4, figs. 1-2 (1929). (Type from S. Rhodesia).

Although this species is remarkably uniform through its distribution range in Africa and elsewhere, a few unusually large specimens similar to *T. dentata* have been found. These differ from typical *T. dentata* in having two or three pairs of veins anastomosing below the sinus whereas only a single pair anastomose in typical *T. dentata*. Also there are consistently fewer reduced basal pinnae than in luxuriant forms of typical *T. dentata*. Since a small number of specimens appear to be intermediate between the typical species and the more luxuriant plants, described here as var. *buchananii*, this new taxon has not been given specific rank.

Thelypteris dentata (Forsk.) E. St. John var. ***buchananii*** Schelpe var. nov.

Differt a varietata typica, planta robustiori, venulis 2—3 jugis basalibus confluentibus sub sinum.

VARIETAL HOLOTYPE: MOÇAMBIQUE, Manica e Sofala, Garuso, "Jaegersberg" (Bandula Mountain); locally frequent on streambank in forest. 2,600 ft. alt., 11. vii. 1955. *Schelpe* 5599 (BOL).

VARIETAL PARATYPES: SOUTH AFRICA: Natal, Durban district, Bush Swamp, *Buchanan* 8 (K).

RHODESIA: Melsetter district, Chimamimani Mountains, east bank of Haroni Gorge, *Mitchell* 401 (BOL).

MOÇAMBIQUE: Manica e Sofala, Bandula, *Chase* 6196 (BOL ex SRGH); Garuso, *Schelpe* 5603 (BM. BOL); Zambesia, Metolola, *Barbosa & Carvalho* 3999 (BOL).

Specimens of the var. *buchanani* from Moçambique were erroneously referred by Alston (1954) to the West African *Cyclosorus venulosus* (Hook.) Tard. As this name is based on *Nephrodium venulosum* Hook. non. Kunze, it should be known as *Thelypteris elata* (Mett. ex Kuhn) Schelpe comb. nov. (Basionym: *Aspidium elatum* Mett. ex Kuhn, Fil. Afr. : 130 (1868)).

The Mascarene *Nephrodium mauritianum* Fée non Desv. is even more distinct from *T. dentata* var. *buchananii* in that it has the frond abruptly and longly decrescent into a long series of much reduced auriculate pinnae. As the next available name for *Nephrodium mauritianum* Fée non Desv. appears to be *Nephrodium leuconeuvron* Fée this Mascarene plant should be known as *Thelypteris leuconeuvron* (Fée) Schelpe comb. nov. (Basionym: *Nephrodium leuconeuvron* Fée, Mém. Fam. Foug., **5** : 306, t. 18, fig. 3 (1852)).

8. ***Thelypteris quadrangularis*** (Fée) Schelpe in Journ. S. Afr. Bot., **30** : 196 (1964).

Nephrodium quadrangulare Fée, Mém. Fam. Foug., **5** : 308 (1852). (Type from British Guiana).

Dryopteris quadrangularis (Fée) Alston in Journ. of Bot., **75** : 253 (1937).

Cyclosorus quadrangularis (Fée) Tard. in Not. Syst., **14** : 345 (1952).

Dryopteris contigua Rosenst. in Meded. Rijksherb., Leiden, n. 31 : 8 (1917). (Type from Borneo).

Cyclosorus contiguus (Rosenst.) Copel., Gen., Fil.: 142 (1947).

Although no material of the type collection of *Nephrodium quadrangulare* Fée has been found, the African plants referred to this species are almost certainly conspecific with specimens from the type area and neighbouring parts of South America which agree with the type description.

The very obtuse angle formed by the anastomosis of the lowest veinlets is characteristic.

9. ***Thelypteris extensa*** (Blume) Morton in Amer. Fern Journ., **49** : 113 (1959).

Aspidium extensum Blume, Enum. Pl. Jav. : 156 (1828). (Type from Java).

Dryopteris extensa (Blume) O. Kuntze, Rev. Gen. Pl., **2** : 812 (1891).

Cyclosorus extensus (Blume) H. Ito in Bot. Mag. Tokyo, **51** : 713, fig. 6 (1937).

Nephrodium wakefieldii Bak. in Ann. of Bot., **5** : 326 (1891). (Type from Kenya; seen at K).

Aspidium wakefieldii (Bak.) Hieron. in Engler, Pflanzenw. Ost-Afr., **C** : 85 (1895).

Dryopteris wakefieldii (Bak.) C. Chr., Ind. Fil. : 301 (1905).

Cyclosorus wakefieldii (Bak.) Ching in Bull. Fan. Mem. Inst. Biol. Bot., **10** : 250 (1941).

T. extensa is a widespread species of the Old World tropics which is easily recognised by the non-decrescent bases of the fronds, the numerous yellow glands along the veinlets on the undersurface, and the narrowed bases of the lowest pinnae.

According to Posthumus (1937), *Aspidium extensum* Blume is a synonym of *Nephrodium impressum* Desv., an earlier name based on a specimen from Timor, but it has not been possible to check this opinion.

10. *Thelypteris madagascariensis* (Fée) Schelpe comb. nov.

Goniopteris madagascariensis Fée, Mém. Fam. Foug., **5** : 251 (1852) (Type from Madagascar)—basionym.

Dryopteris madagascariensis (Fée) C. Chr., Ind. Fil.: 276 (1905).

Cyclosorus madagascariensis (Fée) Ching in Bull. Fan Mem. Inst. Biol. Bot., **10** : 246 (1941).

Goniopteris patens Fée, Mém. Fam. Foug., **5** : 253 (1852). (Type from Natal, South Africa).

Nephrodium patens (Fée) J. Sm., Hist. Fil.: 208 (1878) non (Sw.) Desv. (1827).

Cyclosorus patens (Fée) Copel., Gen. Fil.: 143 (1947).

Gymnogramme unita Kunze in Linnaea, **18** : 115 (1844) non *Cyclosorus unitus* (L.) Ching (1932) (Type from Natal).

Phegopteris unita (Kunze) Mett., Farng., Pheg. u. Asp.: n. 42 (1858).

Polypodium unitum (Kunze) Hook., Sp. Fil., **5** : 5 (1863) non L. (1759).

Goniopteris unita (Kunze) J. Sm., Hist. Fil.: 192 (1875).

Gonipteris silvatica Pappe & Raws., Syn. Fil. Afr. Austr.: 39 (1858) nom. illegit. (Type from Natal).

Dryopteris silvatica (Pappe & Raws.) C. Chr., Ind. Fil.: 292 (1905).

Cyclosorus silvaticus (Pappe & Raws.) Ching in Bull. Fan. Mem. Inst. Biol. Bot., **10** : 249 (1941).

Nephrodium costulare Bak. in Journ. Linn. Soc., Lond., Bot., **16** : 203 (1877) (Type from Madagascar).

Dryopteris costularis (Bak.) C. Chr., Ind. Fil.: 258 (1905).

Cyclosorus costularis (Bak.) Adams & Alston in Bull. Brit. Mus. Nat. Hist., Bot., **1** : 158 (1955).

Dryopteris gladiata C. Chr. in Ark. f. Bot., **14** (19) : 4, t. 1 (1916). (Type from Madagascar).

T. madagascariensis was previously known in South Africa as *Dryopteris silvatica* (Pappe & Raws.) C. Chr. by Sim (1915) and later authors.

11. *Thelypteris totta* (Thunb.) Schelpe in Journ. S. Afr. Bot., **29 : 91 (1963).**

Polypodium tottum Thunb., Prod. Pl. Cap.: 172 (1800). (Type from Cape Province, South Africa; seen at UPS).

Aspidium goggilodus Schkuhr, Krypt. Gew., **1** : 193, t.33c (1809). (Type from British Guiana).

Polystichum goggilodus (Schkuhr) Gaud. in Freyc., Voy. Bot.: 326 (1827).

Cyclosorus goggilodus (Schkuhr) Link, Hort. Berol., **2** : 128 (1833).